TYPE-1000
TELEDAPTER

INSTRUCTION BOOK

Tel-Instrument Co. Inc.
728 GARDEN STREET
CARLSTADT, NEW JERSEY

TYPE 1000 TELEDAPTER

Section 1

GENERAL DESCRIPTION

The Tel-Instrument Type 1000 TELEDAPTER is a portable high-gain video type amplifier particularly designed for use with the DuMont Type 208 oscillograph to permit the use of this instrument for the study of extremely sharp pulses, video signals, and other waveshapes having very high frequency components. The width and depth of the Teledapter match that of the 208 and tie plates are furnished to fasten the two units together. A female type receptacle is provided at the rear of the unit to obtain power for the 208 oscillograph thus permitting the use of the teledapter power switch to control the combined unit.

The Teledapter has been designed to have an extremely wide bandwidth having not more than 10% tilt on a 10 cps square-wave and being flat within 3 Db to 6 MC. A special shielded probe having an attenuation constant of 10:1 and equipped with a four-foot cable is provided to apply the signal to the amplifier. Unlike conventional oscillograph probes, this unit will not pick up extraneous pulses from circuits adjacent to those under test. A four position attenuator switch plus a continuously variable attenuator of 10:1 range provide an attenuation range of 80 Db. This wide range of attenuation is necessitated by the high-gain of the Teledapter which, when used with the 208 oscillograph, results in a basic sensitivity of approximately 10 Millivolts RMS per inch.

The Teledapter may also be used as a video amplifier in television receiver design to drive the cathode or control grid of the cathode ray picture tubes as the available output voltage, permissible capacitance, loading, high gain, wide-band response, and choice of output polarities make it ideal for this purpose.

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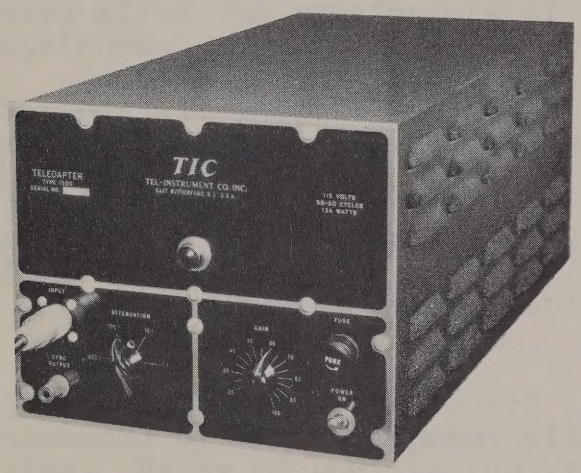
OPERATING INSTRUCTIONS

for

Tel-Instrument

TYPE 1000

Teledapter



Tel-Instrument Co. Inc.

728 GARDEN STREET
CARLSTADT, NEW JERSEY

OPERATING INSTRUCTIONS

for

Teletypewriter

TYPE 1000

Teledeltos

The Tel-Instrument Co., Inc. warrants each new product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to us intact for our examination with all transportation charges prepaid to our factory within ninety days from the date of sale to original purchaser, and provided that such examination discloses, in our judgment, that it is thus defective.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

Parts will be made available for a minimum period of five (5) years after the manufacture of this equipment has been discontinued.

Parts include all materials, charts, instructions, diagrams, accessories, etcetera, which have been furnished in the standard model.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

ADDITIONAL INFORMATION with regard to the applications and maintenance of this equipment will be available from time to time. Users of our instruments are urged to discuss their problems with us and to suggest such modifications as might make them more adaptable to their special requirements.

MAINTENANCE difficulties should be reported before proceeding with actual repairs since our familiarity with such problems will usually suggest a simpler procedure.

NO PART OF THIS MANUAL MAY BE REPRODUCED IN WHOLE OR IN PART EXCEPT BY PERMISSION OF TEL-INSTRUMENT CO. INC.

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CARLSTADT, N.J.

TABLE OF CONTENTS

Section 1

GENERAL DESCRIPTION . . . . . Page 1-1

Section 2

INSTALLATION Page 2-1
2-2

Section 3

THEORY Page 3-1
3-2

Section 4

MAINTENANCE Page 4-1
4-2

Section 5

SPECIFICATIONS Page 5-1
5-2

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INSTALLATION

Section 2

The Teledapter has been specifically designed for mounting on top of the DuMont Type 208 Oscillograph. The following instructions should be carefully followed to properly fasten the units together:

The two retaining screws at the rear of the 208 cabinet should be removed, and the 208 removed from the cabinet (Caution -- Do Not loosen any screws on the front panel of the 208). It is now possible to remove the handle fastened to the top of the cabinet. (Do not lose any of the screws as the handle will be fastened to the top of the Teledapter). While the 208 is out of its cabinet, the leads from the D3 and D4 posts on the rear terminal board to the 5LP-Cathode Ray Tube should be dressed away from the chassis to minimize the capacitance to ground. After this has been done, the 208 may be replaced in its cabinet and the two retaining screws in the rear replaced.

The Teledapter should now be removed from its cabinet be removing the three Phillips head screws at the top of the panel and the three No. 10 screws at the rear of the cabinet. The handle removed from the 208 should now be mounted on the top of the Teledapter cabinet using the screws originally used to fasten it to the 208. At this time it is well to check that all the tubes in the Teledapter are seated in their sockets and that the preamplifier sub-chassis is floating freely. The Teledapter may now be placed back in its cabinet and the six retaining screws replaced.

The two tie plates furnished with the Teledapter should now be fastened to the sides of the cabinet using six of the self-tapping screws furnished. Place the unit on top of the 208 and temporarily block up the rear of the unit so that it is level. A No. 31 drill should now be used to drill six holes in the 208 cabinet, using the holes in the bottom edge of the tie plates for a drilling template. The remaining self-tapping screws are used to bolt the tie plates to the 208 cabinet resulting in one solidly fastened well-balanced unit.

It will be noticed that the D3-D4 terminals on the board in the rear of the 208 are strapped to the terminals underneath them. Remove these straps and replace them with 1/2

Watt 5 meg carbon resistors. The free ends of the two connecting leads supplied with the Teledapter should be fastened to the top terminal of each pair and the tip ends plugged into the tip jacks on the rear of the Teledapter without crossing the leads. A wire should be run from the middle retaining screw on the back of the Teledapter to the single binding post on the 208 terminal board. Another wire should be run from the "Sync Out" terminal on the Teledapter front panel to the "External Sync Signal" binding post on the 208 front panel. The 208 power cord should be plugged into the female AC outlet in the rear of the Teledapter and the Teledapter cord plugged into any convenient 115 V, 60 cycle outlet. This completes the normal installation. The Teledapter power switch now controls the power for both units.

THEORY

Section 3

Reference to the schematic diagram in the rear of this book will show that the input signal is coupled, through a blocking capacitor, to a four-position compensated attenuator switch. This switch, while superficially resembling a standard attenuator assembly, has several novel features. For example, all of the resistors used in this assembly are of a new type having far superior characteristics to those ordinarily used, and having far better square wave response in the mid-frequency range (5-10 KC). Capacitor C-7 has been added to maintain input capacitance of the tube V-1 is connected directly to the input or tapped down on the divider. Capacitor C-2 is used to equalize the 10:1 attenuator contained in the shielded probe, as the shielding makes it difficult to get into the probe to adjust the internal balancing capacitance.

Cathode follower tube V-1 is used as an impedance transformer so that a low impedance gain control may be used while maintaining a high input impedance. Blocking capacitor C-10 is used to keep DC off the gain control so that the cathode ray tube trace will not "surge" when the gain control is operated. The socket for this tube is shock-mounted to minimize microphonics and the plate voltage for the tube is doubly regulated to minimize the effect of line voltage surges.

The first two amplifier stages and their associated components are mounted on a separate shock-mounted chassis so that the entire amplifier is essentially free of microphonics. All three 6AC7 amplifiers employ plate circuit decoupling filters for low-frequency compensation and shunt peaking for high-frequency compensation. The first stage is also operated from a regulated voltage source to make it independent of line voltage variations, and employs a bias cell for grid bias so that no loss or gain will result from the unbypassed cathode resistor.

The output stage uses push-pull parallel 6AG7's to develop sufficient output voltage over the wide bandwidth desired. The tubes are wired in a self-balancing cathode coupled phase-inverter circuit. Positive bias from the power supply

balances out the excess voltage developed across the large cathode resistor. There is no low-frequency compensation but shunt-peaking high-frequency compensation is used. The push-pull output of this stage is capacitance coupled to the 208 deflection plates. The overall gain of the complete amplifier is such that the full-gain sensitivity is approximately 10 millivolts rms per inch.

Power for the complete unit is supplied by a 5U4G in a conventional full-wave condenser input rectifier circuit. A potentiometer is connected across the amplifier filament winding to provide adjustable humbucking action.

A sample of the signal from the cathode of V-4 is taken to the front panel for connection to the "External Synchronization" post of the 208 for synchronizing purposes.

MAINTENANCE

Section 4

The components of the Teledapter have been selected and tested to provide long-trouble-free operating life, and the only service necessary should be the replacement of vacuum tubes. The locations of the vacuum tubes are plainly marked on the chassis. Should any trouble develop in this instrument, it may be serviced with the aid of the schematic diagram. Major repairs however are usually handled by the factory.

Under no circumstances should the instrument be returned to the factory without proper return authorization and shipping instructions. In any correspondence with the factory concerning repairs, the type and serial numbers of the instrument must be given, together with a description of the trouble encountered.

If trouble is had with the low-frequency squarewave response, it is most probably due to loss of capacitance of the electrolytic compensating capacitors. They should be checked on a reliable bridge, and if any bad sections are found, the whole multiple unit should be replaced as the other sections will probably fail very shortly thereafter. Adjustment of the low frequency response after electrolytic capacitor replacement is accomplished by varying the values of the grid resistors R1, R24 and R32. This should be done while observing the response of the unit to a 10 cycle squarewave. Make sure that the amplifier is not being overloaded by excess signal. The preferred method of compensating the amplifier is to disconnect C-13, feed the signal into the grid of V-4 and adjust R32. Reconnect C-13, disconnect C-11, feed the signal into the grid of V-3 and adjust R24. Reconnect C-13, feed the signal into the input jack, and adjust R-16. The unit is now adjusted for best low-frequency squarewave response.

High frequency alignment (adjustment of the peaking coil slugs) is best accomplished with the aid of a 100 KC squarewave generator. The procedure given below should be carefully followed for optimum results. Disconnect C15 and feed the 100 KC signal into the grids of V5 and V6. Disconnect one of the output leads to the deflection plates of the 208 and adjust the core of the peaking coil associated with the other lead for maximum inductance without overshooting. Connect the unused deflection

plate lead, disconnect the other, and similarly adjust the other 6AG7 peaking coil. Reconnect C15, Disconnect C13, feed the signal into the grid of V4 and adjust L3 in the same manner as above. Reconnect C13, disconnect C11, feed the signal into the grid of V3 and adjust L2 as above. Reconnect C11, set attenuator at L:1, feed signal into panel input jack and adjust L:1 as above. This completes the high frequency amplifier alignment.

The only remaining adjustments are on the input attenuators. These should be adjusted with a 1KC squarewave, using the procedure given below. The position of the gain control is immaterial. Feed the signal into the input jack unless otherwise noted.

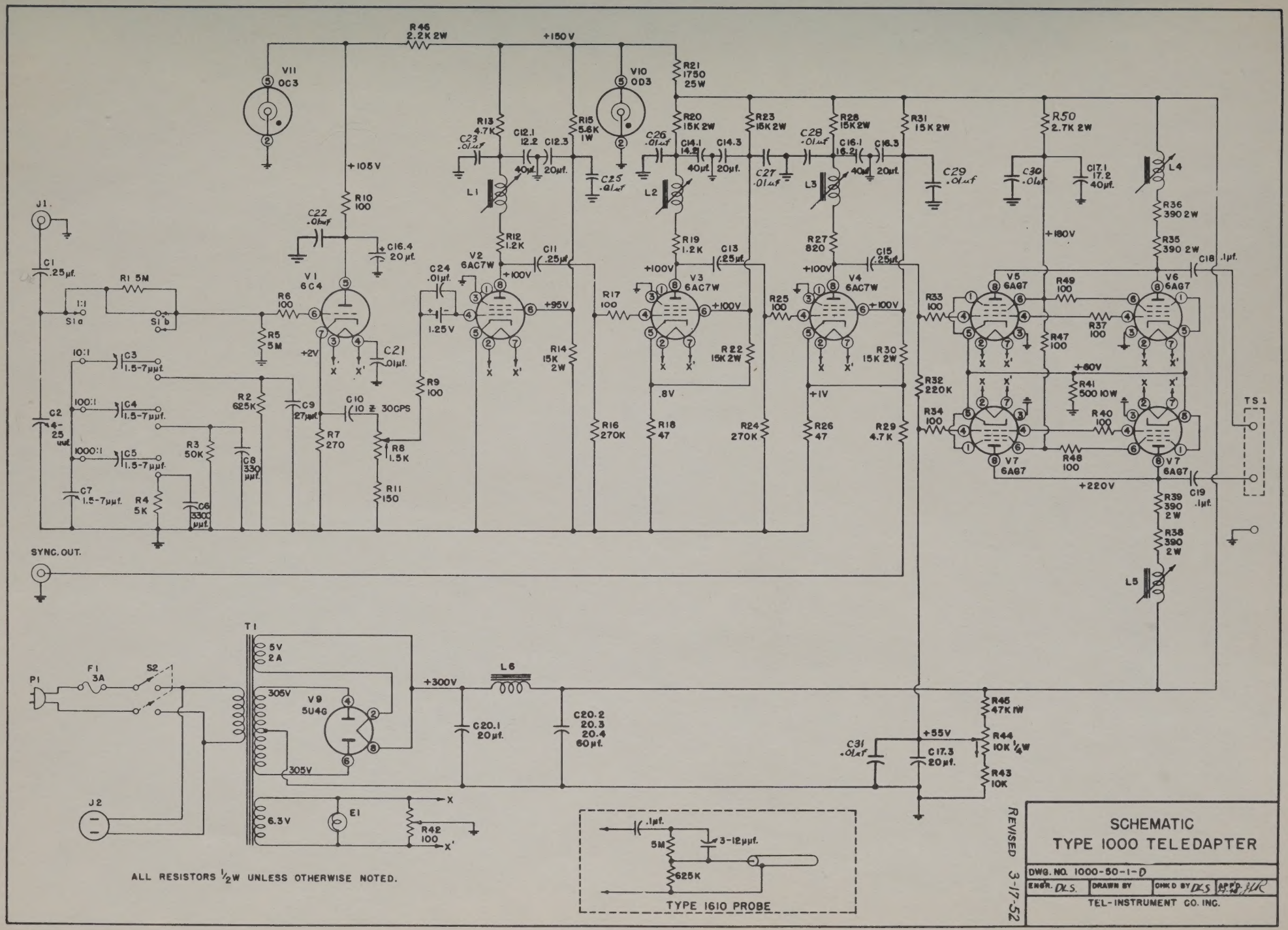
With the attenuation switch set at 1:1, the squarewave should appear on the 208 screen with no distortion. Now set the attenuator at 10:1, increase the input level to give the same size pattern. If the picture is not the same, adjust C3 on the attenuation switch with a non-metallic screwdriver until the response is the same as with no attenuation. The 100:1 and 1000:1 steps are adjusted in the same manner, the respective trimmers being C4 and C5. Now plug in the probe cable, set the attenuation switch at 1:1, feed the signal into the probe, and adjust C2 for minimum distortion of the squarewave. If no setting of C2 permits satisfactory adjustment, the probe must be taken apart and the condenser inside adjusted for best response with C2 set at 1/3 capacity. Now reassemble the probe and adjust C2 for best response to take care of the effect of the metal probe case. The final adjustment is made by setting the switch at 10:1 and adjusting C-7 for best response to compensate for V-1 input capacity.

SPECIFICATIONS

Section 5

Input Impedance:	Probe 5 Meg and 15 mmf. Panel Connector: 5 megohms and 35 mmf.
Frequency Response:	Uniform within 3 Db to 6 MC at any attenuator setting. No overshoot on squarewave having rise time 0.1 usec. nor more than 10% tilt on 10 cps squarewave.
Deflection Factor:	Probe: 0.3 volts peak to peak per inch. Panel: 0.3 volts peak to peak per inch.
Undistorted Deflection:	Max. 2.5 inch so long as there is no dissymmetry of the positive and negative portions of the wave and 1.25 inch deflection for extremely narrow pulses.
Gain at Panel Connector:	Approximately 66 Db.
Input Potential:	Max. 400 V DC or peak AC for either probe or direct connection.
Linear Time Base:	No linear time base is provided. Use internal sweep of 208 Oscillograph.
Attenuator:	Attenuation ratio's of 1000/100/10 and 1 to 1 are provided by means of a selector switch.
Hum Level:	Less than 0.1 inch peak to peak.
Power Supply:	117 Volts 60 cycle single phase A.C.
Power Input:	Approximately 135 Watts. Fuse protection 2 Amps.

Vacuum Tubes:	1 - 6C4 Cathode Follower input 3 - 6AC7-W Amplifiers 4 - 6AG7 P.P. parallel output amplifiers 1 - 5U4G Rectifier 1 - 0D3 Regulator 1 - 0C3 Regulator
Dimensions:	7-1/4" high, 8-3/4" wide, 18-13/16" deep excluding handle and front panel controls.


R46 2.2K 2W
+150V
V11 0C3
V10 0D3
R21 1750 25W
R13 4.7K
R15 5.6K 1W
C23 .01μf
C12.1 12.2
C12.3
C26 .01μf
C14.1 14.2
C14.3
C28 .01μf
C16.1 16.2
C16.3
R20 15K 2W
R23 15K 2W
R28 15K 2W
R31 15K 2W
R50 2.7K 2W
C30 .01μf
C17.1 17.2 40μf.
L4
R36 390 2W
R35 390 2W
C18 .1μf.
+180V
+105V
R10 100
C22 .01μf
C16.4 20μf.
L1
L2
L3
C25 .01μf
C27 .01μf
C29 .01μf
J1.
C1 .25μf.
R1 5M
1:1
S1a
S1b
V1 6C4
R6 100
R5 5M
+2V
C21 .01μf.
C24 .01μf.
1.25V
V2 6AC7W
V3 6AC7W
V4 6AC7W
V5 6AG7
V6 6AG7
V7 6AG7
+100V
+95V
C11 .25μf
C13 .25μf
C15 .25μf
R12 1.2K
R19 1.2K
R27 820
R17 100
R25 100
R33 100
R49 100
R37 100
R47 100
R14 15K 2W
R22 15K 2W
R30 15K 2W
R16 270K
R18 47
R24 270K
R26 47
R29 4.7K
.8V
+1V
+80V
R41 500 10W
R40 100
R48 100
R32 220K
R34 100
+220V
C19 .1μf.
R39 390 2W
R38 390 2W
L5
TS 1
10:1
C3 1.5-7μμf.
100:1
C4 1.5-7μμf.
1000:1
C5 1.5-7μμf.
C7 1.5-7μμf.
C2 4-25 μμf.
R3 50K
C8 330 μμf.
R4 5K
C6 330 μμf.
R2 625K
C9 27μμf.
C10 10 ± 30CPS
R7 270
R8 1.5K
R11 150
R9 100
SYNC. OUT.
T1
5V 2A
305V
V9 5U4G
305V
6.3V
E1
X
X'
R42 100
P1
F1 3A
S2
J2
+300V
L6
C20.1 20μf.
C20.2 20.3 20.4 60μf.
C31 .01μf
+55V
C17.3 20μf.
R45 47K 1W
R44 10K 1/4W
R43 10K
.1μf.
5M
3-12μμf.
625K
TYPE 1610 PROBE
ALL RESISTORS 1/2W UNLESS OTHERWISE NOTED.
REVISED 3-17-52
SCHEMATIC
TYPE 1000 TELEDAPTER
DWG. NO. 1000-50-1-D
ENGR. DLS.
DRAWN BY
CHK'D BY DLS
APP'D HR
TEL-INSTRUMENT CO. INC.